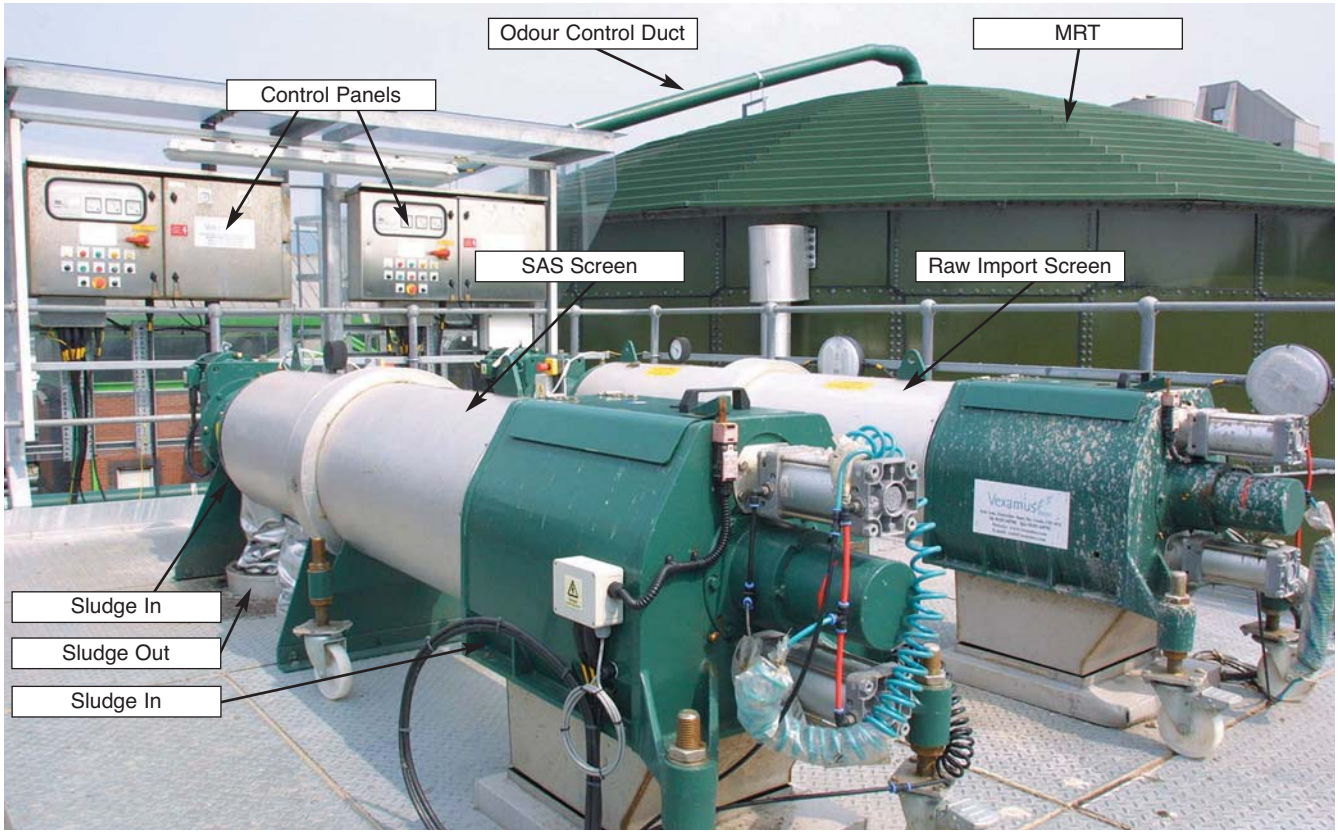
Southport WwTW upgrade & improvements
meeting new "Safe Sludge Matrix' requirements

Main focus for a near £2m 44 week contract for improvement and refurbishment of sludge processes at Southport Wastewater Treatment Works was the revised Department of the Environment, Food and Rural Affairs (DEFRA) "Sludge (Use in Agriculture) Regulations 1989. These Regulations are to be amended to incorporate requirements of the 'Safe Sludge Matrix' - a voluntary agreement between water companies and the British Retail Consortium. The new regulations will define 'treated' and 'enhanced treated' sludge and will specify conditions under which they can be recycled to land. They will introduce numerical standards for sludge applied to agricultural land, specifically for proportional removal and maximum allowable concentration of coliforms.



Observational experience has shown that processing sludge under mesophillic anaerobic digestion for an average of 12 days, followed by batched secondary digestion of 14 days, ensures a level of coliform removal that is in compliance with the draft DEFRA Treated Sludge Standard.

Framework contractor

KMI Water, a joint venture company formed by *Kier Construction Ltd, J Murphy Ltd* and *Interserve Project Services Ltd,* three of the UK's largest construction companies was successful in securing a framework to provide United Utilities (UU) with a totally integrated approach to deliver part of its third Water & Waste Water Asset Management Program (AMP3), between 2002 and 2005.

The work is let under a Framework Agreement Contract (ECC) Option C and applies to projects mainly throughout West Lancashire and North Manchester. This Central Area Framework Contract was awarded in early 2002 with an indicative value of approximately £250m.

In August 2002, a 44 week contract valued at nearly £2million was awarded under the Central Area Framework Agreement for the improvement and refurbishment of sludge processes at Southport Wastewater Treatment Works.

The contract to regularise sludge output comprised the design, construction and commissioning of the following works.

* refurbish existing storm tanks de-sludge pumps;
* new control software for storm tank de-sludge pumps;
* refurbish imported sludge transfer pumps;
* new inline pressurised sludge screens and skip loading area;
* new mixing balancing tank (MBT);
* new digester feed pumps;
* empty and clean two primary digesters;
* carry out modification works to primary digesters;
* empty and clean four secondary digestion tanks;
* replace existing secondary digestion tanks Flygt mixers with an air mixing system.

* provide new software to control secondary digestion tank filling and emptying;
* install air mixing system to existing emergency storage tank - proposed operational storage tank (OST);
* new OST discharge pumps;
* new Odour Control Units;
* new MCC;
* modifications to existing PLCs.

One of the many challenges to the project was the continuance of the existing complex process during construction of the new and refurbishment of existing elements. The logistics of carrying out the work both physically and with regard to timing were crucial. This involved close liaison with the design teams, operations staff, and management of sub-contractors ICA control systems to ensure that the works were built and brought on line in an efficient and controlled manner.

The construction programme was very much geared with United Utilities (UU) Operations team in mind. The collaboration between *UU, Montgomery Watson Harza* construction project team and *KMI Water* needed to be exemplary. and the programme recognise UU outages and key milestones.

Experience demanded that early involvement of all levels of United Utilities staff and operations were involved in the selection and integration of good design, to draw on their knowledge for delivery of new processes and plant, and the final commissioning of projects.

To achieve this, the requirement of "best value" against the desire for a "Rolls Royce" product was considered. A good working relationship and trust was established within the delivery team; this was supported by an "open book" approach in working together. This promoted frank discussion and swifter decision making to achieve the common goal, reducing the need for alterations and avoiding delays to projects at all stages within the design, construction, commissioning and handover phases of the plant.

Programme

The contract commenced with the removal of approximately 20% of the contents from each of the two existing Primary Digesters, with each digester holding 2000m^3 of raw sludge. In order to ensure the operational function of the plant each digester was decommissioned separately and remaining levels strictly monitored. Similarly, approximately 200m^3 of grit was removed from each of four secondary digestion tanks with the same careful attention to levels and continuing plant function.

The existing storm tanks were next to be flushed out and refurbished following an internal inspection.

Two sludge screens were installed, one to treat flows from the existing SAS pump station at 17 l/s with a dry solids content of 1%. The other to receive flows from the refurbished sludge transfer pump station at 26 l/s and a dry solids content of 3%.

Operational difficulties had been experienced with the mixing of the four existing secondary digestion tanks. It was therefore decided that air mixing would be installed within the four tanks so that the total mixing was complete within six hours. Air mixing was installed under the UU Framework Agreement.

A new sludge Mixing Balancing Tank, complete with air mixing was constructed to mix the incoming imported sludges and site generated storm sludges.

The existing ICA and electrical system was completely overhauled. Work involved the modification of several MCCs and upgrade of the control and SCADA systems whilst not compromising reliability of the system. In addition to being completely automated the works now has the facility to be fully monitored and controlled remotely.

Close Out

With the emphasis on speedy close out of design issues and snags, both the client and contractors benefited from the timely completion, testing and acceptance of the works.

United Utilities has expressed satisfaction with the completed plant and equally importantly recognised and appreciated the close liaison role taken by KMI Water and MWH to ensure minimal disruption and provide a good working relationship whilst delivering a quality product. ■

Note: *The Editor & Publshers wish to thank KMI Water, United Utilities and MWH for providing the above article for publication.*